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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,409	03/12/2004	Kenji Tsukada	Q80436	5988
23373	7590	09/30/2004	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			MILLER, ROSE MARY	
			ART UNIT	PAPER NUMBER
			2856	

DATE MAILED: 09/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/798,409	Applicant(s) TSUKADA ET AL.	
	Examiner Rose M Miller	Art Unit 2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 2,3,6-9 and 13-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,5 and 10-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/917,217.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/11/04 & 8/27/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-6 and 9-15, and Species 1 within Group I, in the reply filed on 27 August 2004 is acknowledged.
2. Claims 2-3, 6-9, and 13-15 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention and a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 27 August 2004.
3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Specification

4. The reference to parent application 09/917,217, found in the first paragraph of the specification, must be updated to reflect the current status of the parent application.
5. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
6. While the abstract is not objected to, Applicant is encouraged to rewrite the abstract to more closely represent the claims being prosecuted in the present Application.

Claim Objections

7. Claims 1, 4-5, and 10-12 are objected to because of the following informalities: the phrases "a vibrating part" and "a piezoelectric device", while proper, can lead to confusion as applicant's claims also recite "a second vibrating part" and "a second piezoelectric device". A suggestion for correction is to utilize the phrase "a first vibrating part" and "a first piezoelectric device" to more clearly define the differences between the two recited vibrating parts and the two recited piezoelectric devices. Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by **Anderson (WO 98/09139)**.

Anderson discloses a detector of liquid consumption condition (see Figures) comprising a first vibrating part (54, see Figures) that can vibrate relatively to a containing space (30) that can be filled and refilled with a liquid (32), at least a portion of the vibrating part being exposed to the containing space (see Figures); a first piezoelectric device (10, 12) that can cause the first vibrating part to vibrate based on a driving signal and that can generate a counter electromotive force (resonant vibration) signal by a vibration of the vibrating part (see Figures); a second vibrating part (50, see Figures) that can vibrate relatively to a containing space (30) that can be filled and refilled with a liquid (32), at least a portion of the vibrating part being exposed to the containing space (see Figures); a second piezoelectric device (10, 12) that can cause the second vibrating part to vibrate based on a driving signal and that can generate a counter electromotive force (resonant vibration) signal by a vibration of the vibrating part

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(see Figures); a liquid consumption condition detecting part (AC meter 60 with control 61) that can detect a liquid consumption condition (level in tank) based on the counter electromotive force signal (measured vibration signal) from at least one of the piezoelectric devices (10, 12), wherein the containing space (30) can only contain a predetermined volume of the liquid, the first vibrating part (54) and piezoelectric device is provided in the vicinity of a liquid surface (see page 11, second paragraph) in the containing space (30) when the containing space contains the predetermined volume of liquid, and the second vibrating part (50) and the second piezoelectric device is provided in the vicinity of a liquid surface (see page 12, first paragraph) in the containing space (30) when the liquid is exhausted from the containing space.

With regards to claim 5, **Anderson** discloses a liquid container comprising: a wall part (30, 34, 36) defining a containing space (see Figures) that can contain a liquid in a refillable manner (see Figures), a first vibrating part (54, see Figures) that can vibrate relatively to a containing space (30) that can be filled and refilled with a liquid (32), at least a portion of the vibrating part being exposed to the containing space (see Figures); a first piezoelectric device (10, 12) that can cause the first vibrating part to vibrate based on a driving signal and that can generate a counter electromotive force (resonant vibration) signal by a vibration of the vibrating part (see Figures); a second vibrating part (50, see Figures) that can vibrate relatively to a containing space (30) that can be filled and refilled with a liquid (32), at least a portion of the vibrating part being exposed to the containing space (see Figures); a second piezoelectric device (10, 12) that can cause the second vibrating part to vibrate based on a driving signal and that can generate a counter electromotive force (resonant vibration) signal by a vibration of the vibrating part (see Figures); a liquid consumption condition detecting part (AC meter 60 with control 61) that can detect a liquid consumption condition (level in tank) based on the counter electromotive force signal (measured vibration signal) from at least one of the piezoelectric devices (10, 12), wherein the containing space (30) can only contain a predetermined volume of the liquid, the first vibrating part (54) and piezoelectric device is provided in the vicinity of a liquid surface (see page 11, second paragraph) in the containing space (30) when the containing space contains the predetermined volume of

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liquid, and the second vibrating part (50) and the second piezoelectric device is provided in the vicinity of a liquid surface (see page 12, first paragraph) in the containing space (30) when the liquid is exhausted from the containing space.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Anderson** in view of **Daniels et al. (US 5,035,140)**.

Anderson discloses the claimed invention with the exception of the liquid consumption detecting part is adapted to detect the liquid consumption condition based on a relative relationship between the two counter electromotive force signals from the first piezoelectric device and the second piezoelectric device.

Daniels et al. teaches at column 4 lines 49-59 reading both the sensor indicating a "full" container and the sensor indicating an "empty" container in order to determine an error in one of the sensors. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify **Anderson** to include a

relative relationship between the signals from the first piezoelectric device (sensor) and the second piezoelectric device (sensor) in order to determine the presence of contaminants on either sensor as **Daniels et al.** teaches that the reading of both sensors provides for a quick and easy determination of the presence of contaminants on a sensor and allows for the cleaning of such sensors in order to remove the errors present.

13. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Anderson** in view of **Nolting et al. (US 4,329,875)**.

Anderson discloses the claimed invention with the exception of the liquid condition detecting part being adapted to measure a frequency of the counter electromotive force signal wherein either (a) the liquid consumption condition detecting part has a counter that can count the number of vibrations in the counter electromotive force signal for a predetermined time; and the liquid consumption condition detecting part is adapted to measure the frequency of the counter electromotive force signal based on the number counted by the counter, or (b) the liquid consumption condition detecting part has a clock-counter that can measure a time for which the counter electromotive force signal vibrates a predetermined number of times; and the liquid consumption condition detecting part is adapted to measure the frequency of the counter electromotive force signal based on the time measured by the clock-counter.

As for claim 10, **Anderson** discloses on page 12, third paragraph, monitoring the frequency of the sensor in order to determine the density of the liquid under test. **Nolting et al.** discloses a liquid level detector comprising a piezoelectric transducer that measures the frequency of the transducer in order to determine the level of liquid in the container based upon the measured frequency. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Anderson** with means for determining the frequency of the counter electromotive force signal in order to determine the level of the liquid in the container as **Nolting et al.** clearly teaches using a measurement of frequency to determine the level of liquid in a container.

As to claim 11, **Nolting et al.** discloses a liquid level detector comprising a piezoelectric transducer that measures the frequency of the transducer by counting the number of vibrations in the counter electromotive force signal for a predetermined time. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Anderson** with a counter that can count the number of vibrations in the counter electromotive force signal for a predetermined time and the liquid consumption condition detecting part is adapted to measure the frequency of the counter electromotive force signal, based on the number counted by the counter, as **Nolting et al.** teaches using a frequency counter to determine the level of liquid in a container.

As to claim 12, it is known in the art of vibrational measuring and testing that frequency can be measured by counting the number of pulses produced during a period of time (as utilized by **Nolting et al.**). It would have been obvious to one of ordinary skill in the art that the frequency of vibration could also be measure by the amount of time required to count a predetermined number of pulses as one of ordinary skill in the art would know that the two methods are merely different variations of the same circuitry, all based on the components available to the designer. The relationship between the two methods is merely a simple equation which is solved based on which is characteristic measured, the number of clock pulses produced in a particular time period or the time period required to produce a specific number of clock pulses (or vibrations). Therefore, it would have been obvious to one of ordinary skill in the art to provide the system of **Anderson** with the clock-counter in order to determine the frequency of the piezoelectric vibrator and therefore the liquid consumption condition (liquid level) of the liquid remaining in the container.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Westcott et al. (US 3,110,890) discloses an apparatus for measuring fluid level in a container.

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Rod (US 3,220,258) discloses a system for sensing the presence or absence of material in a container.

Sogo (US 4,107,994) discloses a level detector for a container.

Takeuchi et al. (JP 58205820 A) discloses a liquid level sensor.

Reymond et al. (FR 2572519 A1) discloses a transducer level detector.

Benz et al. (US 4,594,891) discloses a resonating rod level detector.

Hasegawa et al. (JP 62095225 A) discloses a recorder with piezoelectric level detector.

Umezawa et al. (US 5,247,832) discloses a vibrator level sensor.

Pfeiffer (US 5,264,831) discloses a device for determining and/or monitoring a predetermined contents level in a container.

Hermann (US 5,524,486) discloses a device for measuring, controlling, and/or detecting the filling level in a container.

Kurihara et al. (JP 10305590 A) discloses a sensor for detecting the amount of ink remaining in a container.


15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rose M Miller whose telephone number is 571-272-2199. The examiner can normally be reached on Monday - Thursday, 7:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


RMM

22 September 2004


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